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EXAMINER	
YAKULIS, JEFFREY C	
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SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

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Office Action Summary	Application No. 10/824,718	Applicant(s) AJMERA ET AL.
	Examiner Jeff Yakulis	Art Unit 1709

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 4/14/2004.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-23 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-23 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 18 April 2003 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date 7/6/2004.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "the plating bath" in lines 3-4. There is insufficient antecedent basis for this limitation in the claim.

Claim 1 recites the limitation "the plating solution" in line 7. There is insufficient antecedent basis for this limitation in the claim.

Claim 1 recites the limitation "the surface" in line 7. There is insufficient antecedent basis for this limitation in the claim.

Claim 1 recites the limitation "the plater" in line 8. There is insufficient antecedent basis for this limitation in the claim.

Claim 4 recites the limitation "the plating process" in line 15-16. There is insufficient antecedent basis for this limitation in the claim.

Claim 10 recites the limitation "the plating solution" in line 7. There is insufficient antecedent basis for this limitation in the claim.

Claim 10 recites the limitation "the weir-type plater" in line 14. There is insufficient antecedent basis for this limitation in the claim.

Claim 18 recites the limitation "the surface contaminants" in line 15. There is insufficient antecedent basis for this limitation in the claim.

Claim 18 recites the limitation "the plating solution" in line 16. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 10 and 12 rejected under 35 U.S.C. 102(b) as being anticipated by Brooks (4,415,423).

Regarding claim 10, Brooks teaches lowering an empty contact ring assembly into a plating solution (col. 4 lines 45-48; mounting head [32] functions as contact ring assembly and electrolyte [42] as the plating solution), receiving at least a portion of the upper layer of the plating solution over a weir (col. 4 lines 41-45), filtering the received portion of the upper layer of the plating solution to remove contaminants (col. 4 lines 49-51; plating solution is electrolyte [42]), and recirculating the filtered plating solution to the weir-type plater (col. 4 53-55).

Regarding claim 12, Brooks teaches tilting the contact ring in the plating solution (col. 3 lines 68 and col. 4 lines 1-3 and col. 3 lines 43-45 mounting head [32] has means for electrical contact).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1, 2,9, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brooks (4,415,423).

7. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Regarding claim 1, Brooks teaches positioning a lower portion of a substrate support assembly into a plating bath (col. 3 lines 43-46 descibes a support assembly and col. 3 lines 68 and col. 4 lines 1-2 describes positioning the mounting head [32] at the surface of the electrolyte [42] which functions as a "plating bath") and circulating the plating solution such that contaminants accumulating on the surface of the plating solution are urged to flow over a weir of the plater (col. 4 lines 41-45).

Brooks fails to disclose rotating the substrate support assembly at a rotation rate of between 1-60 rpm for between 5-30 seconds.

Brooks however does involve rotating the revolving cathode at a sufficient force to cause outward turbulence at the surface of the electrolyte, which forces foreign materials away from the cathode head (col. 4 lines 56-63). Brooks then notes that this removal of foreign materials away from the revolving cathode head reduces or eliminates micro-defects being formed on electroformed parts (col. 4 lines 56-63).

Rotational speed and time are therefore result effective variables capable of optimization. One having ordinary skill in the art at the time the invention was made would know to adjust the speed and time to achieve a sufficient force in order to remove foreign materials away from the revolving cathode and thereby eliminating micro-defects in the electroformed part (See MPEP 2144.04).

Regarding claim 2, Brooks teaches the lower portion of the substrate support assembly comprises a contact ring (col. 3 lines 43-46; the mounting head [32] functions as a support assembly and though not shown in the figure it is noted that means for electrical contact with cathode drive [34] is provided functioning as the contact ring).

Regarding claim 9, Brooks teaches filtering the plating solution urged to flow over the weir (col. 4 lines 41-48).

Regarding claim 11, in addition to the limitations as discussed with regard to claim 10 Brooks further teaches rotating the contact ring (col. 3 lines 41-46) but fails to disclose: the rotational speed (5-35 rpm).

Brooks however does involve rotating the revolving cathode at a sufficient force to cause outward turbulence at the surface of the electrolyte, which forces foreign materials away from the cathode head (col. 4 lines 56-63). Brooks then notes that this removal of foreign materials away from the revolving cathode head reduces or eliminates micro-defects being formed on electroformed parts (col. 4 lines 56-63).

Rotational speed and time are therefore result effective variables capable of optimization. One having ordinary skill in the art at the time the invention was made would know to adjust the speed and time to achieve a sufficient force in order to remove foreign materials away from the revolving cathode and thereby eliminating micro-defects in the electroformed part (See MPEP 2144.04).

8. Claim 4, 14, 18, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brooks (4,415,423) in view of Batz, Jr. et al. (6,527,925).

Regarding claim 4, Brooks teaches all the limitations previously mentioned in claim 2 and a contact ring in a plating bath, but fails to disclose: contact pins on the contact ring.

Batz, Jr. et al. is relevant because it deals with contact ring assemblies used in electroplating processes. Batz Jr. et al. teaches contact pins on a contact ring (col. 8 lines 10-19; figure 3 specifically show contact members [254] connected to a ring). Batz Jr. et al. also notes that the uniformity of the plated metal layer is influenced by the distribution of current across the workpiece (col. 2 lines 9-19). One factor to control the current density is to provide for electrical contact around the perimeter of the workpiece (col. 2 lines 9-19). Batz Jr. finally notes that a large number of electrical contacts should

contact the peremiter of the workpiece to provide for a uniform current distribution (col. 2 lines 9-19).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to add the contact members [254] of Batz Jr. et al. to the device of Brooks in order to achieve uniform current distribution across the workpiece and thus allowing for uniformity in the plated metal layer.

Regarding claim 14, Brooks teaches all the limitations of claim 11 mentioned above as well lowering a contact ring into a plating solution (col. 4 lines 45-48; mounting head [32] functions as contact ring assembly and electrolyte [42] is the plating solution), but fails to disclose: contact pins arranged onto the surface of the contact ring.

Batz, Jr. et al. is relevant because it deals with contact ring assemblies used in electroplating processes. Batz Jr. et al. teaches contact pins on a contact ring (col. 8 lines 10-19; figure 3 specifically show contact members [254] connected to a ring). Batz Jr. et al. also notes that the uniformity of the plated metal later is influenced by the distribution of current across the workpiece (col. 2 lines 9-19). One factor to control the current density is to provide for electrical contact around the perimeter of the workpiece (col. 2 lines 9-19). Batz Jr. finally notes that a large number of electrical contacts should contact the perimeter of the workpiece to provide for a uniform current distribution (col. 2 lines 9-19).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to add the contact members [254] of Batz Jr. et al. to the device of

Brooks in order to achieve uniform current distribution across the workpiece thus allowing for uniformity of the plated metal layer.

Regarding claim 18, Brooks teaches positioning a lower portion of a contact ring in contact with a plating solution (col. 4 lines 45-48; mounting head [32] functions as contact ring assembly and electrolyte [42] is the plating solution), rotating the contact ring to urge the surface contaminants to flow over a weir (col 4 lines 41-45), collecting the plating solution flowing over the weir (col. 4 lines 47-49; sump [22] collects the plating solution), and filtering the collected plating solution to remove the surface contaminants (col. 4 50-52), but fails to disclose a plurality of electrical substrate contact pins extending from the contact ring.

Batz, Jr. et al. is relevant because it deals with contact ring assemblies used in electroplating processes. Batz Jr. et al. teaches contact pins on a contact ring (col. 8 lines 10-19; figure 3 specifically shows contact members [254] connected to a ring). Batz Jr. et al. also notes that the uniformity of the plated metal later is influenced by the distribution of current across the workpiece (col. 2 lines 9-19). One factor to control the current density is to provide for electrical contact around the perimeter of the workpiece (col. 2 lines 9-19). Batz Jr. finally notes that a large number of electrical contacts should contact the peremiter of the workpiece to provide for a uniform current distribution (col. 2 lines 9-19).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to add the contact members [254] of Batz Jr. et al. to the mounting

head [32] of Brooks in order to achieve uniform current distribution across the workpiece thus allowing for uniformity of the plated metal layer.

Regarding claim 19, modified Brooks teaches the limitations of claim 19 above but fails to disclose the rotation speed (5-45 rpm).

Brooks however does involve rotating the revolving cathode at a sufficient force to cause outward turbulence at the surface of the electrolyte and forces foreign materials away from the cathode head (col. 4 lines 56-63). Brooks then notes that this removal of foreign materials away from the revolving cathode head reduces or eliminates micro-defects being formed on electroformed parts (col. 4 lines 56-63).

Rotational speed and time are therefore result effective variables capable of optimization. One having ordinary skill in the art at the time the invention was made would know to adjust the speed and time to achieve a sufficient force in order to remove foreign materials away from the revolving cathode and thereby eliminating micro-defects in the electroformed part (See MPEP 2144.04).

9. Claims 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brooks (4,415,423) as applied to claim 2 above, and further in view of Marohl et al. (6,034,863).

Brooks teaches a contact ring, but fails to disclose: scallops formed on the lower surface of the contact ring.

Marohl et al. is relevant because it deals with the design of a workpiece in an electroplating system. Marohl et al. teaches a plurality of scallop sections [116] (col. 4 lines 47-50). Marohl et al. notes the necessity for an improved thermal transfer element assembly (col. 2 lines 13-18). An improved thermal transfer element would allow for

temperature uniformity across the wafer (col. 2 lines 13-18). Marohl et al. further notes a thermal transfer assembly design utilizing a series of scalloped portions (col. 2 lines 21-34).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute the scallop design utilized in the thermal transfer element assembly of Marohl et al. into the contact ring of Brooks in order to solve the problem of maintaining uniform temperatures across the wafer.

10. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over modified Brooks (4,415,423) as applied to claim 11 above, and further in view of Batz, Jr. et al. (6,527,925) and Marohl et al. (6,034,863).

Brooks teaches a contact ring (mounting head [32]), but fails to teach a plurality of scallops immersed in the plating solution and a plurality of contact pins positioned above the upper surface of the plating solution.

Marohl et al. is relevant because it deals with the design of a workpiece in an electroplating system. Marohl et al. teaches a plurality of scallop sections [116] (col. 4 lines 47-50). Marohl et al. notes the necessity for an improved thermal transfer element assembly (col. 2 lines 13-18). An improved thermal transfer element would allow for temperature uniformity across the wafer (col. 2 lines 13-18). Marohl et al. further notes a thermal transfer assembly design utilizing a series of scalloped portions (col. 2 lines 21-34).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute the scallop design utilized in the thermal transfer

element assembly of Marohl et al. into the mounting head [32] of Brooks in order to solve the problem of maintaining uniform temperatures across the wafer.

Batz, Jr. et al. is relevant because it deals with contact ring assemblies used in electroplating processes. Batz Jr. et al. teaches contact pins on a contact ring (col. 8 lines 10-19; figure 3 specifically shows contact members [254] connected to a ring). Batz Jr. et al. also notes that the uniformity of the plated metal later is influenced by the distribution of current across the workpiece (col. 2 lines 9-19). One factor to control the current density is to provide for electrical contact around the perimeter of the workpiece (col. 2 lines 9-19). Batz Jr. finally notes that a large number of electrical contacts should contact the peremiter of the workpiece to provide for a uniform current distribution (col. 2 lines 9-19).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to add the contact members [254] of Batz Jr. et al. to the mounting head [32] of Brooks in order to achieve uniform current distribution across the workpiece thus allowing for uniformity of the plated metal layer.

Regarding the positioning of the scallops and contact pins, looking to figure 1 of Brooks illustrates a portion of mounting head assembly [32] is positioned above the electrolyte [42] (functioning as a plating solution). Therefore Brooks as modified utilizing the scallop design and contact pins would inherently have this positioning.

11. Claims 5-7, 15, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brooks (4,415,423) and Batz, Jr. et al. (6,527,925) as applied to claim 4 and 14 above, and further in view of Graham et al. (6,599,412).

Regarding claim 5, modified Brooks teaches all the previous limitations of claim 4 mentioned above and the rotation of the contact pins but fails to disclose: deplating the electrical contact pins.

Graham et al. is directed toward cleaning methods for electrodes used in electroplating. Graham et al. notes the possibility of electrodes used to conduct plating power to a workpiece may develop deposits, especially when they are exposed to an electrolyte (col. 37 lines 35-39). Graham et al. further notes two cycles a normal cycle and a cleaning cycle. The cleaning cycle functions to remove particles from the electrode that deposited during the normal cycle (col. 37 lines 39-46). This cleaning step is essentially deplating the electrode (contact pins are functioning as electrodes as they serve to deliver electrical power to the substrate).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the cleaning cycle discussed by Graham et al. into the process of modified Brooks in order to solve the problem of removing particles from the electrode deposited during the normal cycle.

Regarding claim 6, Graham et al. further teaches the reverse bias having a voltage between 100 mV and 10 V (col. 38 lines 1-4, changing the direction of the current to the electrode (a reverse bias) and a suitable voltage range for this opposing current is in the range of 1-10 volts).

Regarding claim 7, modified Brooks teaches all the limitations of claim 6 mentioned above but fails to disclose a time range for the reverse bias (1-360 seconds).

One having ordinary skill in the art at the time the invention was made would be able to choose a time period appropriate for removing the built-up deposits. The time would depend on the thickness of the deposits to be removed and the voltage applied among other variables.

Regarding claim 15, modified Brooks teaches all the limitations of claim 14 above and electrical contact pins immersed in a plating solution but fails to disclose: applying a deplating bias to the pins.

Graham et al. is directed toward cleaning methods for electrodes used in electroplating. Graham et al. the possibility of electrodes used to conduct plating power to a workpiece may develop deposits, especially when they are exposed to an electrolyte (col. 37 lines 35-39). Graham et al. further notes two cycles: a normal cycle and a cleaning cycle. The cleaning cycle functions to remove particles from the electrode that deposited during the normal cycle (col. 37 39-46). This cleaning step is essentially deplating the electrode (contact pins are functioning as electrodes as they serve to deliver electrical power to the substrate).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the cleaning cycle discussed by Graham et al. into the process of modified Brooks in order to solve the problem of removing particles from the electrode deposited during the normal cycle.

Regarding claim 16, Graham et al. further teaches the voltage range (1-5 volts) of the deplating bias (col. 38 lines 1-4).

12. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brooks (4,415,423) and Batz, Jr. et al. (6,527,925) as applied to claim 19 above, and further in view of Marohl et al. (6,034,863).

Modified Brooks discloses all the previously limitations of claim 19 above and immersing a contact ring with a plurality of electrical substrate contact pins in the plating solution (immersing in the plating solution can be illustrated in figure 1 of Brooks, mounting head [32]), but fails to disclose a plurality of scallops formed onto the lower surface of the contact ring.

Marohl et al. is relevant because it deals with the design of a workpiece in an electroplating system. Marohl et al. teaches a plurality of scallop sections [116] (col. 4 lines 47-50). Marohl also teaches the scallop sections [116] meeting with the finger portion [222] of clamping ring [104] (contact ring). Marohl et al. notes the necessity for an improved thermal transfer element assembly (col. 2 lines 13-18). An improved thermal transfer element assembly would allow for temperature uniformity across the wafer (col. 2 lines 13-18). Marohl et al. further notes a thermal transfer assembly design utilizing a series of scalloped portions and finger contacts, which overcomes the disadvantages of previous thermal transfer element assemblies (col. 2 lines 21-34).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute the scallop and finger portion design utilized in the thermal transfer element assembly of Marohl et al. into the mounting head [32] of Brooks in order in order to solve the problem of maintaining uniform temperatures across the wafer.

13. Claims 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brooks (4,415,423), Batz, Jr. et al. (6,527,925), and Marohl et al. (6,034,863) as applied to claims 20 above, and further in view of Graham et al. (6,599,412).

Regarding claim 21, modified Brooks teaches all the previous limitations and the immersion of electrical contact pins in plating solution but fails to disclose: applying a deplating bias to the contact pins.

Graham et al. is relevant because it is directed toward cleaning methods for electrodes used in electroplating. Graham et al. notes the possibility of electrodes used to conduct plating power to a workpiece may develop deposits especially when they are exposed to the electrolyte (col. 37 lines 35-39). Graham et al. further notes two cycles a normal cycle and a cleaning cycle. The cleaning cycle functions to remove particles from the electrode that deposited during the normal cycle (col. 37 39-46). This cleaning step is essentially deplating the electrode (contact pins are functioning as an electrode).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the cleaning cycle discussed by Graham et al. into the process of modified Brooks in order to solve the problem of removing particles from the electrode deposited during the normal cycle.

Regarding claim 22, Graham et al. further teaches the reverse bias having a voltage between 100 mV and 10 volts (col. 38 lines 1-4).

14. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brooks (4,415,423) and Batz, Jr. et al. (6,527,925) as applied to claim 18 above, and further in view of Mayer et al. (6,964,792).

Modified Brooks teaches all the limitations mentioned above as well as tilting the contact ring and an angle but fails to disclose: an angle of about 3-10 degrees from horizontal.

Mayer et al. is relevant because it is directed toward controlling electrolyte flow in an electroplating apparatus. Mayer et al notes the advantages of removing bubbles from the surface of a wafer during electroplating which allows for improved film uniformity and quality (col. 2 lines 50-63). Mayer et al. teaches tilting an electrode at preferably 5 degrees from horizontal results in the removal of bubbles along a bubble removal path [223] (col. 7 lines 47-67).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use utilize the tilting angle of Mayer et al and apply at as the angle of tilt used in modified Brooks in order to effectively remove bubbles from the surface of a workpiece thus improving the quality of the film plated on the substrate.

15. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over modified Brooks (4,415,423) as applied to claim 11 above, and further in view of Polan et al. (4,956,053).

Regarding claim 17, modified Brooks teaches all the limitations above and filtering the electrolyte [42] (plating solution), but fails to disclose the porosity of the filter (.05-2 microns).

Polan et al. is relevant because it deals with circulation of an electrolyte through a series of filters. Polan et al. teaches passing an electrolyte [24] through a particulate

filter [47] having a mesh size of preferably .05-3 microns to remove solid particulate matter from the electrolyte [42] (col. 6 lines 64-68).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the filter porosity size of Polan et al. into the filter design of Brooks in order to solve the problem of removing particulates from an electrolyte.

16. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brooks (4,415,423), Batz, Jr. et al. (6,527,925), and Graham et al. (6,599,412) as applied to claim 6 above, and further in view of Simpson et al. (6,500,324).

Modified Brooks teaches all the limitations previously mentioned but fails to disclose: the reverse bias is at least one of constant bias, ramping bias, and a pulsed bias.

Simpson et al. is relevant because it deals with electroplating and current density modifiers. Simpson et al. teaches several different biasing conditions including: a constant and pulsed bias (col. 4 lines 40-45). Simpson et al. notes biasing helps reduce the current density at the edge of the substrate thereby reducing plating at the edge of the substrate (col. 4 lines 46-50). This results in a much more uniform thickness of the plated material (col. 4 lines 53-57).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute the biasing conditions of Simpson et al. into the process of modified Brooks in order to achieve a more uniform coating during the plating process.

Conclusion

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeff Yakulis whose telephone number is 571-272-9807. The examiner can normally be reached on M-F 7:30 AM-5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JCY
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SUPERVISORY PATENT EXAMINER